CLAIMS

1. A method of preparing substantially purified DNA, without the use of nucleases or proteases, by adding an effective amount of a compaction agent to a lysate to precipitate, from said lysate, DNA having a content of RNA of less than 3% by weight.

2. A method for the production of purified DNA having a content of RNA of less than about 3% by weight, comprising in combination the following steps:

A. lysing a cell mass to liberate the nucleic acids

B. optionally precipitating some additional moieties.

C. optionally adjusting the ionic strength and/or plasmid concentration and;

D. precipitating a substantial fraction of the DNA away from contaminating RNA and protein by addition of an effective amount of a compaction agent.

3. A composition of matter comprising DNA, substantially free of added nucleases, and containing less than about 3% by weight RNA

4. A method of treatment of a mixture comprising desired RNA product and contaminating DNA comprising mechanical lysis of the mixture in the presence of a compaction agent to precipitate at least a portion of the contaminating DNA.

5. A composition of Claim 3 comprising a plasmid DNA encoding proteins for use as a vaccine.

6. A method for making a biochemical assay comprising hybridizing a labeled probe to a target and thereafter precipitating the probe and the target, leaving the unhybridized probe substantially in solution.

7. A method according to Claim 2 for producing ribosomal RNA, chromosomal DNA, plasmid DNA, aptamers, artificial RNA, or mRNA or other natural or synthetic nucleic acids.

8. The method of Claim 1 in which the addition of the compaction agent comprises the addition of two or more different mixed compaction agents whereby improved separation efficiency results.

. 9. A method according to Claim 1 additionally comprising stripping the compaction agent by a stripping method selected from the group comprising high salt addition and/or a pH shift.

10. A composition for the recovery of DNA comprising a mixture of combined reagents, one of which lyses and one of which precipitates DNA to clarify a cell mass.

11. A method according to Claim 2 additionally comprising a technique selected from the group consisting of: use of French cell press, addition of nonionic detergent, lysozyme addition, microfluidizer, freeze-thaw or any other relatively low ionic strength lysis technique to produce nucleic acid free lysates for later protein recovery.

12. A method according to Claim 1 comprising simultaneous application of the method in parallel mini-prep procedures for a plurality of cell masses.

13. A method of assay comprising precipitating a labeled probe while it is hybridized to a target.

14. A method according to Claim 2 additionally comprising a further separation step comprising one or more techniques selected from the group consisting of: precipitation and resuspension, filtration and adsorptionfor production of more pure product.

15. A method according to Claim 2 comprising addition of about 0.001 to 20 mM of a compaction agent selected from the group consisting of: basic polypeptides, polyamines, trivalent and tetravalent metal ions, or manganese chloride.

16. The method of Claim 2 wherein the source of the lysate comprises gram-positive bacteria, yeast, eukaryotes, synthesized nucleic acids, Archaea, bacteria, protozoa, phages, other viruses, human cells, body fluids, mixtures of cells, tissues, or environmental samples.

17.A method of performing a bioassay or separation comprising compaction precipitation, wherein a tagged probe (e.g. a fluoresceinated probe) is added to a solution containing its target, a double stranded nucleic acid is formed and this new structured hybrid nucleic acid is then selectively precipitated while the unhybridized single stranded probe is substantially left in solution.

18. A composition of Claim 3 comprising less than 0.1 Units endotoxin per microgram plasmid DNA (EU/ug or IE/ug).

19. A biotech kit comprising compaction agent and other reagents and apparatus designed for the purification of nucleic acids from lysates or synthetic solutions.

20. Each invention described herein.

Table A

Parameter	Units	Preferred	Most Pref.
Cell Mass		**Archaea eukaryotes bacterial,Gram-negative Gram-positive phage, yeast**	**Gram-neg**
Product:		**DNA,RNA, Assay NA-binding protein enzymes,cosmids, YACs, Plasmid**	**plasmid DNA**

Compaction Agent: basic polypeptides (e.g. polylysine) , polyamines (e.g. protamine, spermidine, spermine, putrescine, cadaverine, etc.), trivalent and tetravalent metal ions (e.g. hexammine cobalt, chloropentammine cobalt, chromium (III)), netropsin, distamycin, lexitropans, DAPI (4',6 diamino 2-phenylindol), berenil, pentamidine, manganese chloride. Most preferred: hexammine cobalt, spermine and spermidine

CA Conc. mM	**0.02-20**	**0.05-10**

Lysing Agent: detergent		**nonionic det.**	**BPER for RNA;**
	(alkaline lysis is m.p. for plasmidDNA)		
" " Conc.:wt%		**0.5-2**	**.05-.5**
pH:	**varies**	**6-8**	**7**
Ionic Strength:mM		**0-200**	**0-50**
(Before Compaction)			
Endotoxin Level		**>0.3 EU/mL**	**>0.1 EU/mL**